



COURSE INFORMATION FORM

Course Name	Course Code
STRENGTH OF MATERIALS II	151414559

Semester	Number of Course Hours per Week		ECTS
	Theory	Practice	
4	3	0	4

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
1	2	1		

Course Language	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite(s) if any	-
Objectives of the Course	Investigation of the behavior of beams, columns, and similar structural elements under the influence of two or more sectional forces, and calculation of the stress and deformation caused by external loads on the elements. Determination of the dimensions that a structural element must have to fulfill its function.
Short Course Content	Bending: Simple bending, oblique bending, bending of composite beams. Combined Stress States: Shear bending, normal force and bending. Introduction to Elastic Stability: General theory of elastic columns, Euler cases. Elastic Curve: Integration method, energy methods.

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Develops knowledge to be used in engineering designs.	1, 2	1, 5, 10	A, K
2 Can calculate the stress and deformations resulting from sectional forces in combined stress states.	1, 2	1, 5, 10	A, K
3 Learns the importance of material and sectional properties in design.	1, 2	1, 5, 10	A, K
4 Can perform sizing by selecting material and/or section.	1, 2	1, 5, 10	A, K
5 Can calculate displacement and deformation in structures with a large number of elements.	1, 2	1, 5, 10	A, K
6			
7			
8			

*Teaching Methods 1:Expression, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Trouble/Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

**Measuring Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

Main Textbook	Uğural, A.C., Mechanics of Materials, Mc Graw-Hill, 1991 İnan, M., Cisimlerin Mukavemeti, İTÜ Vakfı Yayını, 1990
Supporting References	Erol, H., Şengel, H.S. ve Özçelikörs, Y., Mukavemet I-II sunu ders notları. Omurtag M.H., Mukavemet (Cilt 1), Birsen yayınevi, 2011. Omurtag M.H., Mukavemet çözümlü problemler (Cilt 1), Birsen yayınevi, 2011.
Necessary Course Material	Calculator, protractor, compass, set square, pencil, eraser

Course Schedule	
1	Torsional Moment State: Torsional moment diagrams, calculation of stress in circular cross-section elements, calculation of strain, sizing of circular cross-section elements
2	Calculation of Strain Energy in Torsion: Torsion of non-circular sections
3	Simple Bending: Definition, assumptions, calculation of stress and deformation in pure bending
4	Oblique Bending, Calculation of stress and deformation
5	Oblique Bending, Calculation of stress and deformation
6	Composite Beams, Calculation of stress and deformation
7	Elastic Curve Determination, Using the integration method
8	Mid-Term Exam
9	Combined Stress States: Shear bending I
10	Combined Stress States: Shear bending II
11	Limitations in the Use of Shear Stress Formula, Distribution of shear stresses in I-sections
12	Shear Flow, Shear Center
13	Combined Stress States: Calculation of stress and deformation under eccentric normal force
14	Determination of the Core Area of a Section, Asymmetric single foundation calculation
15	Buckling of Columns, Critical stress-slenderness relationship
16,17	Final Exam

Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,...)	14	2	28
Homework	0	0	0
Quiz Exam	0	0	0
Studying for Quiz Exam	0	0	0
Oral exam	0	0	0
Studying for Oral Exam	0	0	0
Report (Preparation and presentation time included)	0	0	0
Project (Preparation and presentation time included)	0	0	0
Presentation (Preparation time included)	0	0	0
Mid-Term Exam	1	1.5	1.5
Studying for Mid-Term Exam	1	20	20
Final Exam	1	1.5	1.5
Studying for Final Exam	1	20	20
Total workload			113
Total workload / 30			3.77
Course ECTS Credit			4

Evaluation	
Activity Type	%
Mid-term	40
Quiz	
Homework	
Bir öge seçin.	
Bir öge seçin.	
Final Exam	60
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	PROGRAM OUTCOME	Contribution
1	Strong background in mathematics, science, and fundamental engineering principles; ability to apply theoretical and practical knowledge from these fields to model and solve engineering problems	4
2	Expertise in identifying, defining, and formulating complex engineering problems in civil engineering and related fields. Ability to select and apply appropriate analysis and modeling methods to solve these problems	4
3	Ability to design complex systems, devices, or products under realistic constraints and conditions. Proficiency in using modern design methods to meet specific objectives	
4	Competence in developing, selecting, and using modern techniques and tools for civil engineering applications. Effective utilization of information technologies to support engineering tasks	
5	Expertise in designing experiments, conducting tests, collecting data, analyzing results, and interpreting findings for civil engineering problem investigations	
6	Ability to work effectively in both intradisciplinary and interdisciplinary teams	
7	Effective Turkish oral and written communication skills and proficiency in using and developing foreign language skills	
8	Commitment to lifelong learning. Ability to access information, stay up-to-date with advances in science and technology, and continuously self-improve	
9	Strong sense of professional and ethical responsibility	
10	Knowledge of project management, risk management, and change management practices; awareness of entrepreneurship, innovation, and sustainable development principles	
11	Understanding of the global and societal impacts of engineering applications on health, the environment, and safety; awareness of national and international legal regulations, standards, and the legal implications of engineering solutions	
12		

LECTURER(S)				
Prepared by	Assis. Prof. Dr. Hasan Selim ŞENGEL			
Signature(s)				

Date: 06.06.2024